

St. Lucie County Regional DRI Transportation Study

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INTRODUCTION

In south central St. Lucie County, development of a once rural area of ranches, groves, and farms has consumed several thousand acres with several thousand more acres likely to change from rural to suburban use in the next decade. Perhaps the most acute issue facing future development in this area is competition for limited roadway capacity.

Five major DRI's totaling over 14,000 acres, including 30,133 residential units and over 14 million square feet of nonresidential space, are planned for the area. About 20% of this development is built and occupied. The rest is expected to be completed by the year 2022. All of this development has been planned and is to be built in a sprawling suburban pattern as conventional resort/housing subdivisions, office/industrial space and retail strip. Also occupying space within this pattern is a major league spring training facility; Florida Atlantic University and Indian River Community College educational facilities; a PGA golf training facility and several golf courses; and various service, entertainment and lodging uses.

The travel patterns and behavior of residents in the area change and respond to the built environment as it transforms from rural to suburban. For example, a person originally traveling east outside the area for work, necessities or entertainment may have these needs satisfied much closer to home or find them by traveling in the opposite direction as new nonresidential development is added nearby. Accurately understanding these changes in travel behavior and trip distribution in this area is critical to public decision-makers and elected officials in St. Lucie County and the City of Port St. Lucie for projecting needed roadway expansions or additions; budgeting for those needs and meeting concurrency requirements and level of service standards established in local comprehensive plans. It will also enable them to fairly assess and determine the responsibilities of developers and enter into equitable partnerships with private investors to complete needed roadway infrastructure.

TRAFFIC STUDY

A regional transportation study has been performed for this area of St. Lucie County. Future traffic generation and distribution within the area has been estimated for the following approved and proposed DRIs: LTC Ranch, The Reserve, PGA Village, St. Lucie West, and Westchester. Infrastructure necessary to maintain adopted levels of service will be determined in the study.

The study area is generally bounded by SR 714 (Martin County) to the south, Edwards Road to the north, Range Line Road to the west and US 1 to the east.

METHODOLOGY

The traffic study has been performed in coordination with FDOT, Martin County, St. Lucie County, City of Port St. Lucie, Martin County, and representatives from each of the DRIs described above.

Although the study was performed in coordination with the agencies and developers mentioned here, the actual calculations and analyses were performed by MTP Group, Inc. FDOT was also very involved with the analysis as well as all model runs which were performed in their offices. There were a number of meetings between October 2002 and April 2003 to discuss methodology and present the analysis as it was being performed.

A summary of the methodology is included in Appendix B. However, this document explains the methodology used in detail.

TRIP GENERATION

Trip generation for each of the DRIs was performed using trip generation rates contained in the *Institute of Transportation Engineers (ITE), Trip Generation Report, 6th Edition*.

Each of the DRIs was divided into Traffic Analysis Zones (TAZs) for its use in the Florida Standard Urban Transportation Model Structure (FSUTMS). Socioeconomic data is entered into these TAZs to estimate traffic generated by the developments. Given the location of the DRIs, PGA Village is the only DRI with one TAZ. All other DRIs contain more than one TAZ.

Appendixes C and D contain daily and PM peak hour trip generation for each of the traffic analysis zones included in the study. Appendix E contains the PM peak hour calculations of internal capture among the different land uses within each TAZ. Internal capture was estimated following the methodology included in the *ITE Trip Generation Handbook*.

Tables A and B summarize the trip generation and internal capture for each of the DRIs by Traffic Analysis Zones.

The Treasure Coast FSUTMS ("the model") which includes Martin County, St. Lucie County and Indian River County was used to estimate traffic projections in the analysis. Socioeconomic data was revised in the model for each of the TAZs to determine traffic generated by the proposed developments in the year 2025. A comparison of daily traffic generated by the model for each TAZ as well as daily traffic estimated using ITE trip generation rates was performed. Adjustments were made to the HASSIGN module of FSUTMS to generate traffic within each TAZ in accordance with the trip generation contained in Appendix C. Traffic generated by the model is within 3% of traffic estimated using ITE trip generation rates.

PGA Village DRI

While PGA Village DRI was included as one TAZ, traffic generated by the Reserve DRI was added to that of PGA Village to determine significant traffic impact. Therefore, from now on, PGA Village includes both developments, PGA Village and the Reserve.

A select zone assignment was conducted using the model to determine traffic assignment for PGA Village DRI.

Total traffic generated by PGA Village DRI was determined by adding traffic generated by each TAZ using both methodologies: ITE trip generation rates and the model. Trip generation calculated using ITE trip generation rates has not been discounted for passer-by to be consistent with trip generation determined using the model. The following table presents gross traffic generated by PGA Village DRI using the two methodologies discussed above:

Development	TAZ	ITE Trip Generation	Model Trip Generation
PGA Village	367	53,811	53,202
The Reserve	368	6,165	6,084
The Reserve	341	34,947	36,988
Total		94,923	96,274

External traffic generated by the model was determined by adding daily traffic at the following locations:

- Commerce Center Parkway south of PGA Village centroid connector
- St. Lucie West Boulevard east of Commerce Center Parkway
- Glades Cut-Off Road north of Commerce Center Parkway
- Glades Cut-Off Road south of Reserve Boulevard

Traffic generated by the model at these locations equal 80,817 which represent 16% internal capture between the three TAZs presented above. The factor was considered appropriate given the mix of land uses and its characteristics.

External traffic generated by PGA Village was calculated as 84% of 94,923 or 79,735 daily trips. External PM peak hour traffic was also calculated as 84% of the PM peak hour traffic determined using ITE trip generation rates. Peak hour traffic was obtained by adding new trips generated by the development for all the TAZs and subtracting 16% internal as follows:

TAZ	Trips In	Trips Out
367	2,974	1,872
368	218	639
341	1,780	1,403
Total	4,972	3,914
Internal (16%)	(711)	(711)
External Trips	4,261	3,203

Westchester DRI

A select zone assignment was conducted using the model to determine traffic assignment for Westchester DRI.

Total traffic generated by Westchester DRI was determined by adding traffic generated by each TAZ using both methodologies: ITE trip generation rates and the model. Trip generation calculated using ITE trip generation rates has not been discounted for passer-by to be consistent with trip generation determined using the model. The following table presents gross traffic generated Westchester DRI using the two methodologies discussed above:

TAZ	ITE Trip Generation	Model Trip Generation
361	8,623	8,730
362	24,679	24,527
363	15,340	15,833
364	17,427	17,648
365	21,670	21,241
366	16,630	16,959
Total	104,369	104,938

External traffic generated by the model was determined by adding daily traffic at the following locations:

- Commerce Center Parkway south north of Westchester centroid connector and
- Gatlin Boulevard east of Commerce Center Parkway.

Traffic generated by the model at these locations equal 75,468 which represent 28% internal capture between the six TAZs presented above. This factor was compared with the internal capture agreed at the methodology meeting for the traffic study presented in the Application for Development Approval (ADA) for Westchester DRI. The internal capture used in the ADA traffic study is 37%. Therefore, an average of the two was used to present internal capture for this development. A 32.5% internal capture was used in the study.

External traffic generated by Westchester was calculated as 67.5% of 104,369 or 70,449 daily trips. External PM peak hour traffic was also calculated as 67.5% of the PM peak hour traffic determined using ITE trip generation rates. Peak hour traffic was obtained by adding new trips generated by the development for all the TAZs and subtracting 32.5% internal as follows:

TAZ	Trips In	Trips Out
361	547	308
362	915	1,548
363	701	967
364	908	790
365	1,239	810
366	999	603
Total	5,309	5,026
Internal (32.5%)	(1,680)	(1,680)
External Trips	3,629	3,346

ADOPTED LEVEL OF SERVICE

Adopted levels of service were provided by the following agencies: Martin County, City of Port St. Lucie, St. Lucie County and FDOT. Service volumes have been obtained from either the local government (where appropriate) or the 2002 Quality/Level of Service Handbook. The analysis was performed in a peak-hour/peak-direction basis. All roadways within the study area are presented in Table 1 with the adopted level of service and corresponding service volume. The table also presents information regarding jurisdiction, facility type and class group. This information was obtained by the appropriate agency as well.

TRAFFIC ASSIGNMENT

Percentage traffic assignment was determined for each of the developments with the use of the select zones in the model. This procedure presents traffic generated by a specific TAZ or group of TAZs in the roadway network.

The following methodology describes the determination of traffic assignment for the developments:

1. 2025 traffic assignment was obtained for each roadway segment presented in Table 1. The amount of traffic volume entering a certain segment was used to represent traffic assignment on that segment. For example: a roadway link with the following three volumes: 300, 250 and 190 will have an assignment of 300.
2. Traffic assignment for each roadway segment was divided by the model generated external traffic to determine percent assignment.
3. Directional distribution of project traffic was determined based on its location and assignment. For example: a roadway segment north of PGA Village will have traffic entering the project in the southbound direction and vice versa.

4. Peak-hour/peak-directional traffic assignment was determined by applying the percentage assignment calculated in item 2. above, times the external PM peak hour project traffic estimated using ITE trip generation rates.

Tables 2 and 4 present PM peak-hour/peak-direction project traffic assignment for PGA Village and Westchester, respectively. All pertinent information is included in the tables.

In accordance with Development of Regional Impact requirements, a project has significant impact when consumes 5% or more of the adopted level of service on a roadway. Tables 3 and 5 present roadway segments with significant impact for PGA Village and Westchester, respectively.

BACKGROUND TRAFFIC

The 2025 traffic projections estimated by the model were used to determine background daily traffic. Daily traffic assignment for both Westchester DRI and PGA Village was subtracted from the 2025 daily traffic projections to estimate unadjusted background traffic. Table 6 summarizes calculations performed to determine background traffic. Based on model output, background traffic for the segments of Commerce Center Parkway between Gatlin Boulevard and St. Lucie West Boulevard is zero. The model assumes all traffic on these roadway segments are either PGA Village or Westchester.

Adjustment factors were used to estimate background traffic using 1996 model generated volume and 1996 counts as presented in the methodology included in Appendix B. Table 7 summarizes the methodology used to develop adjusted background traffic. The methodology used to determine adjusted background traffic where 1996 traffic counts were not available is included in the table.

Existing traffic counts were used to develop K and D factors. Appendix F summarizes traffic counts and calculations of K and D factors for the majority of the roadways in the study. Adjusted background traffic was adjusted with K and D factors to estimate peak-hour/peak-direction background traffic as presented in Table 8.

TOTAL TRAFFIC

Total traffic was developed by adding the estimated peak-hour/peak-direction background traffic and traffic assignment for both PGA Village and Westchester DRIs. The 2025 total traffic projections for peak-hour/peak-direction are presented in Table 9.

ROADWAY NEEDS

Roadway deficiencies were determined by comparing total traffic developed in Table 9 with adopted service volumes presented in Table 1. Table 10 presents roadway links exceeding the adopted service volume in the year 2025. This table also identifies significant impact by PGA Village and Westchester.

Table 11 presents improvements recommended to maintain the roadway network at adopted levels of service (LOS). This Table shows the need to widen Port St. Lucie Boulevard beyond the existing six lane-divided cross-section. As shown in the Table, there are some segments where the adopted LOS could be met with an eight lane-divided facility while some other segments cannot meet the adopted LOS with widening to eight lanes. Therefore, West Virginia Boulevard needs to be considered as an alternative. This roadway has been planned by the City of Port St. Lucie as a limited access 4 lane-divided facility between US-1 and Commerce Center Parkway with a design speed of 50 to 55 mph. A model run was performed to determine traffic projections with the addition of this road in the year 2025. The run shows a decrease of daily traffic on both St. Lucie West/Prima Vista Boulevard and Port St. Lucie Boulevard.

The segment of US 1 between Port St. Lucie Boulevard and Westmoreland Boulevard is expected to exceed the adopted service volume for an eight lane-divided facility. There are also some other segments along US 1 which exceed the adopted service volume of a six lane-divided roadway. Alternate routes need to be evaluated to divert some of the projected traffic along US 1.

St. Lucie West Boulevard is also projected to exceed the service volume of a six lane-divided roadway on the existing six lane-divided bridge over the Turnpike. Construction of West Virginia Boulevard will divert some of the traffic. Other segments of St. Lucie West Boulevard need widening to a six lane-divided cross-section including the existing two lane bridge over I-95.

The segment of West Midway Road between 25th Street and US-1 is projected to exceed its capacity by the year 2025. This roadway segment is considered policy constrained by St. Lucie County. The County is pursuing a PDE study to evaluate alternatives to add capacity to this segment of West Midway Road.

Segments among the following two lane roadways also need widening to maintain the adopted level of service: Glades Cut-Off Road; West Midway Road; Commerce Center Parkway; California Boulevard; East Torino Parkway; Cashmere Boulevard; Jenkins Road; Bayshore Boulevard; and Floresta Drive.